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Photometry of artificial airglow emission of the ionosphere stimulated by "Sura" facility radiation

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Abstract

© 2017 IEEE. A photometric instrument based on the photon - counting is described in the paper. Some experimental results of photometric measurements of artificial airglow at 557.7 nm (green line) and 427.8 nm (blue line) of ionosphere caused by powerful radio emission of the "Sura" facility are presented.

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Keywords

Atomic oxygen, Ionosphere, Photometric measurements of extended faint objects, Powerful radio emission, Stimulated airglow of upper atmosphere

References

[1] A. V. Gurevich "Nonlinear effects in the ionosphere, " Physics-Uspekhi, vol. 50, no. 11, pp. 1091 - 1121, Nov. 2007.

[2] V. V. Belikovich, S. M. Grach, A. N. Karashtin, D. S. Kotik, Y. V. Tokarev, The Sura facility: Study of the atmosphere and space (a review), Radiophysics and Quantum Electronics, vol. 50, no. 7, pp. 497 - 526, July 2007.

[3] A. Thide, B. H. Kopka, P. Stubbe "Observations of stimulated scattering of a strong high frequency radio wave in the ionosphere, " Physical Review Letters, vol. 49, no. 21, pp. 1561 - 1564, 1982.

[4] T. B. Leyser, B. Thide, M. Waldenvik, S. Goodman, V. L. Frolov, S. M. Grach, A. N. Karashtin, G. P. Komrakov, D. S. Kotik "Spectral structure of stimulated electromagnetic emissions between electron cyclotron harmonics, " J. Geophys. Res.: Space Physics, vol. 98, no. 10., pp. 17597 - 17606, October 1993.

[5] R. I. Gumerov, V. B. Kapkov, G. P. Komrakov, A. M. Nasyrov "Artificial ionospheric glow caused by short-Term effect of highpower RF radiation, " Radiophysics and Quantum Electronics, vol. 42, pp.463 - 465, 1999.

[6] S. M. Grach, E. N. Sergeev, A. M. Nasyrov, R. I. Gumerov, R. R. Shaimukhametov, I. A. Nasyrov, G. P. Komrakov "Simultaneous observations of the 557.7 nm airglow and stimulated electromagnetic emission during HF pumping of the ionosphere with diagnostic schedule: First results, "Advances in Space research, vol. 34, no. 11, pp. .2422 - 2427, 2004.

[7] M. J. Kosch, T. Pedersen, J. Hughes, R. Marshall, E. Gerken, D. Sentman, M. McCarrick, F. T. Djuth "Artificial optical emissions at HAARP for pump frequencies near the third and second electron gyroharmonic, " Annales Geophysicae, vol. 23, no. 5, pp. 1585-1592, 2005.

[8] S. M. Grach, E. N. Sergeev, G. P. Komrakov, P. V. Kotov, A. M. Nasyrov, I. A. Nasyrov, R. I. Gumerov, R. R. Shaimukhametov "Studies of artificial airglow emission at 557.7 nm (green line) of upper atmosphere caused by "Sura" facility, " Proceedings of SPIE - The International Society for Optical Engineering, vol. 6522, articlenumber652226, 2006.

[9] S. M. Grach, M. J. Kosch, V. A. Yashnov, E. N. Sergeev, M. A. Atroshenko, P. V. Kotov "On the location and structure of the artificial 630-nm airglow patch over Sura facility, " Annales Geophysicae, vol. 25, pp. 689 - 700, 2007.

[10] L. M. Erukhimov, S. A. Metelev, E. N. Myasnikov, N. A. Mityakov, V. L. Frolov "Artificial ionospheric turbulence (review), " Radiophysics and Quantum Electronics, vol. 30, no. 2, pp. 156-171, February 1987.

[11] M. J. McEwan, L. F. Phillips "Chemistry of the Atmosphere, " Edward Arnold, p.312, 1975.

[12] S. M. Grach, V. V. Klimenko, A. V. Shindin, I. A. Nasyrov, E. N. Sergeev, V. A. Yashnov, N. A. Pogorelko "Airglow during ionospheric modifications by the sura facility radiation. Experimental results obtained in 2010, " Radiophysics and Quantum Electronics, vol. 55, 1-2, pp. 71 - 84, June 2012.

[13] S. M. Grach, V. V. Klimenko, A. V. Shindin, I. A. Nasyrov, E. N. Sergeev, V. A. Yashnov, N. A. Pogorelko "The 630 nm and 557.7 nm airglow during HF ionosphere pumping by the SURA facility radiation for pump frequencies near the fourth electron gyroharmonic, " Radiophysics and Quantum Electronics, vol. 57, no. 11, pp. 759-772, April 2015.